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CENTRAL INTELLIGENCE AGENCY

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REPORT

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COUNTRY USSR (Leningrad)

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SUBJECT Soviet Television Transmitter

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1. Among the development tasks given to Scientific Research Institute 380 (NII-380), Leningrad, in 1948 was that of building a model television transmitter for experimental purposes. This was a 49.75 mc, 25-watt transmitter. The task was assigned to NII-380 by MPSS, the Soviet Ministry for the Communications Equipment Industry. The transmitter was in the first place to be for Professor Ryvlin's use.
2. The transmitter was built on the principle of amplifying modulated cycles. It was made up of two sections, broad band amplification and control transmitter (Steuersender), and narrow band amplification sections.
3. The control transmitter had three stages:
  - a. Crystal stage: Crystal controlled frequency of 8.29 mc. The tubes used were 6-AC-7 types. The anode circuit was tuned to the third harmonic.
  - b. Television stage: Loosely coupled to the anode circuit of 6-AC-7. The tubes used were LV-1 types. Class A amplification. The grid of this tube - the LV-1- had about a 5-volt peak.
  - c. Third stage: The tube used was an LV-3. Acted simultaneously as a doubler stage and a buffer to the push-pull (von Eintakt auf Gegentakt). The frequency was 49.74 mc (sic).
4. Further stages were:
  - a. Modulated stage: The grid had an alternating potential of about 50 volts peak. This stage worked by grid modulation, the biasing voltage and picture synchronization mixing being produced from the modulator. The modulated stage was built around two LV-3 (pentodes) in push-pull.

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Broad-band amplification began with this stage. The anode circuit load (Anodenbelastung) consisted of an inductively coupled band filter. The band-width of this over-critical coupled band filter was about 10 mc. As the next stage used pentodes, the necessary damping of the band filter was produced with inductiveless resistances. The coupling of the band filter could be regulated externally.

- b. Power stage: This stage used two LS-50 pentodes in push-pull circuit. The antenna system was a broad band dipole (with half wave-length feeds), inductively coupled to the final circuit of the final stage. Likewise, damped rejector circuits were coupled to the anode circuit. These both served to shift the left edge of the pass-band (Durchlassbereich). In this way it was possible to achieve the necessary slope of the response curve (Durchlasskurve).

5. Further notes on the transmitter:

- a. The detector: This was capacitively coupled to the inductively coupled antenna circuit. The detector served as an output indicator (antenna current), for picture control, as a monitor and as a degree of modulation control. This was achieved by display of the demodulated carrier on a cathode ray tube. The zero line on the cathode ray tube screen was generated by a polarized relay (fed by 50 kc AC).
- b. Modulation was three-stage; the re-leading in of the continuous voltage component took place in the last stage.
- c. Grid biasing voltage: By regulation of the grid biasing voltage of the final stage of the modulator it was possible to adjust the grid biasing voltage of the whole modulated stage; this was done by conductive coupling of the modulator output to the grid of the modulated stage.
- d. The mains set: The mains set for the two pre-stages of the modulator was simply stabilized and the anode voltage was stabilized by electron tubes. Internal resistance was about 10 ohms.
- e. The constancy of the control voltage on the grid of the modulated stage during the modulation period was achieved by loose coupling.
- f. The antenna: The usual broad-band dipole with director, reflector, and half wave-length feeds was used for the antenna.
- g. Range of the transmitter: This transmitter could radiate over a distance of about 10 kms. It was set up for working between NII-380 and Fontanka experimental works.

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